National Energy Board

CANADA

Office national de l'énergie

File No.: 4500-A000-9
Date: 22 June 1992

TO: Parties Named in the Attached Distribution List (Annex 1)

Re: **Public Consultation on Incentive Regulation**

On 23 March 1992, the Board released a letter (copy attached as Annex 5) outlining its intention to examine incentive regulation through a public consultation process. The Board solicited comments on the suggested format and timing of the process and asked interested parties for their views on the likely nature of their participation. As part of that process, the Board proposed that a technical workshop be held on 27 October 1992 in Calgary.

The purpose of this process is to initiate a public discussion of the possible and practical alternatives or modifications to the traditional cost of service method of regulating pipelines under the Board's jurisdiction. The consultation process of inviting interested parties to submit written papers followed by a technical workshop is designed to encourage an open dialogue in the energy community on the matter of innovative alternatives to the current method of toll making.

The Board has taken no decision to modify or replace the currently used cost of service regulation methodology for pipelines under its jurisdiction. Further, there will be no decision flowing from this process either to retain the current method or to adopt an alternative method for any of the pipelines under the Board's jurisdiction. The concepts developed as a result of this consultation process could, however, be used in subsequent toll hearings, where they could be combined and tailored to the circumstances of individual pipelines.

The 23 March letter was sent to a total of 33 interested parties, including nine industry Associations, six Provincial Governments, ten Group I pipeline companies and thirteen others. Thirty-three parties responded to the NEB's letter of intent. A list of those who responded is attached as Annex 1. All those who responded were generally in favour of the Board's initiative and most of these indicated their intention to actively participate in the proposed public consultation process.

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BACKGROUND PAPER

A background paper titled "Alternatives to Traditional Cost of Service Regulation" is attached as Annex 2. The paper briefly outlines reasons for undertaking this initiative. It includes a summary of some of the alternative models found in the economic and utility regulation literature. Some of the alternatives included in the background paper are theoretical concepts at this time, while others either have been tried or are being considered in other jurisdictions. The alternatives identified in the Background Paper are not necessarily exhaustive and the paper is not intended to preclude the broaching of other possible alternatives. The purpose of the paper is to assist interested parties in formulating specific ideas and to stimulate discussion of potential alternatives and their merits.

LIST OF QUESTIONS

A "Preliminary List of Questions" to be addressed by interested parties is attached as Annex 3. This list is not necessarily exhaustive nor is it intended to limit the scope of discussion on this subject. The sole purpose of this list is to assist interested parties in the preparation of their written submissions to the Board. Parties wishing to add other questions to the preliminary list are invited to submit their proposals to the Board and serve them on the other parties listed in Annex 1 by 6 July 1992. The Board will issue a revised List of Questions by 17 July 1992.

WRITTEN SUBMISSIONS

As indicated in the 23 March 1992 letter, interested parties are invited to file their written submissions with the Board. In order to assist in the orderly conduct of the technical workshop, the Board also invites each interested party to submit comments on other parties' submissions.

TIMING AND FORMAT

1. Interested parties are required to file 30 copies of their written submissions with the Secretary by 30 September 1992. In addition, interested parties are required to serve a copy of their submissions on each of the parties listed in Annex 1 by the same date.

2. Thirty copies of written comments on the initial submissions must be filed with the Secretary by 23 October 1992. Copies should be served on each of the parties listed in Annex 1 by the same date.

3. Shortly after 23 October 1992, the Board will release a List of Issues for discussion at the technical workshop.

4. The workshop will be held in Calgary on 8,9 and 10 December 1992.

5. The specific location and format of the workshop will be announced by the Board at a later date.

6. As early as possible in 1993, the Board will issue the proceedings of the workshop.

VIEWING OF DOCUMENTS

The following documents will be available for public viewing during normal business hours at the Board's Library, First floor, 311 - 6th Avenue S.W., Calgary, Alberta and at the Main Library, Energy, Mines and Resources Canada, 580 Booth Street, Ottawa, Ontario.

1. Copies of the letters received from interested parties in response to the 23 March 1992 letter of the Board.

2. Background paper titled "Alternatives to Traditional Cost of Service Regulation", dated June 1992.

3. Copies of the background literature used in the preparation of the background paper.

4. Written submissions to be filed by interested parties.

5. Comments on the initial written submissions.

J. S. Richardson
Secretary

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ANNEX 2

Alternatives to Traditional Cost of Service Regulation

Background Paper

National Energy Board

June 1992

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Preface

As part of the incentive rate regulation consultations, the National Energy Board is issuing the following background paper on alternatives to traditional cost of service regulation. The paper begins with the reasons for the Board considering incentive regulation at this time. This is followed by a brief description of traditional cost of service (COS) regulation and some of the criticisms which it has drawn. The bulk of the paper is a literature survey of some of the alternatives to COS regulation which have been proposed.

The Board emphasizes that this paper is for discussion purposes only and is not a representation of the Board's position on any aspect of incentive regulation. The Board has made no decision on modifying or replacing the current COS regulation methodology for pipelines under its jurisdiction. No attempt is made in the background paper to evaluate the various alternatives to COS regulation nor is this paper exhaustive in describing the alternatives. The Board is interested in any ideas which could provide benefits to both pipelines and their customers.

I) Introduction

Traditional cost of service (COS) regulation was introduced to control those "natural" monopolies which were deemed to be of sufficient public importance to justify regulation. A natural monopoly is "...an industry in which the economies of scale - that is, the tendency for average costs to decrease the larger the producing firm - are continuous up to the point that one company supplies the entire demand."[1] These natural monopolies were often granted franchises which effectively limited any direct competition for their services and therefore had to be regulated. Examples of such natural monopolies include the provision of electricity, sewage service, telephone service and water as well as pipelines.

COS regulation has been, and continues to be, the way in which the National Energy Board (NEB or the "Board") regulates pipelines within its jurisdiction. This form of regulation has substantial historical precedent and is widely accepted by regulators for the regulation of public utilities.

The use of traditional COS regulation for the regulation of utilities has not been without its critics. Beginning immediately after its introduction[2], and until the present time, traditional COS regulation has received much attention from economists and others who follow the regulatory process. Until recently, however, the majority of public utility boards (PUBs) have judged that the benefits of COS regulation outweigh its drawbacks.

Changing markets, primarily driven by new technology, have transformed some industries which were previously considered to be "natural" monopolies. In particular, the telecommunications sector has been significantly altered by the introduction of fibre optics, cellular phones, satellite transmission, and digital switching technology. These developments have reduced the barriers to entry into certain segments of the telecommunications market which have been traditionally served by the major telephone companies.

A form of incentive regulation called price capping has been implemented in the telecommunications industry in Great Britain and in certain jurisdictions in the U.S. Under these new regulatory schemes, to be discussed in more detail later, price capping has replaced frequent traditional rate hearings with a "formula" that is designed to enhance the cost effectiveness of the regulated companies. While incentive regulation has been introduced on a smaller scale by some PUBs at the state level in the U.S., the application of price capping by federal regulators has raised the profile of new forms of incentive regulation.

The Federal Energy Regulatory Commission (FERC) recently issued a Notice of Proposed Policy Statement (NOPPS) on incentive regulation for federally regulated pipelines in the U.S.[3] Prior to the NOPPS, several pipelines had proposed incentive schemes which FERC considered to be inappropriate. The NOPPS is intended to provide guidelines for any proposed incentive scheme. The most significant feature of the NOPPS guidelines is the requirement that the incentive mechanism provide tangible benefits to ratepayers.

In Canada, the oil and gas producing community has recently challenged the traditional method of regulation of both oil and gas pipelines by the Board. A recent study by PowerWest[4], prepared for the Canadian Petroleum Association (CPA) and the Independent Petroleum Association of Canada (IPAC), found that over the past decade the stock market performance of Canadian utilities, including pipelines, was significantly better than the average performance of all Canadian companies, as measured by the Toronto Stock Exchange 300 index. One possible contributor to such a high valuation for utility stocks could be the returns being granted by PUBs, including the Board.

In two recent toll hearings held by the Board, the CPA has submitted written evidence stating that the method in which the Board determines return on equity (ROE), and particularly the comparable earnings test, has "conceptual problems".[5] The CPA is of the view that the comparable earnings test does not necessarily have any relationship with the concept of a fair return and that the measurement of comparable earnings provides results which are difficult to compare across companies and over time.

IPAC has also expressed concern with respect to COS regulation. In one recent submission, it stated:

> "Traditional regulation places the responsibility of scrutiny of the utility's costs on the shoulders of the regulator and the ratepayer. We are concerned that this process has virtually absolved monopoly utilities from taking meaningful steps towards improved performance. In IPAC's opinion, opposite motivation has arisen whereby utilities profit when they inflate costs and add to ratebase."[6]

Regarding the cost-effectiveness of pipeline operations, IPAC stated that:

> "...regulated utilities do not have sufficient motivation to control costs. In fact, utility profitability may even be enhanced if costs are not controlled."[7]

IPAC has also been critical of how the Board determines ROE, arguing that:

> "...regulators may be reluctant to approve a return for one utility which is significantly different from a return awarded earlier for another utility."[8]

Other regulators have implemented, or are considering experimenting with, alternatives to traditional COS regulation. These alternatives are generically labelled incentive regulation schemes because the majority of them involve some mechanism for providing the utility with an incentive to improve its cost-effectiveness. At the same time, some discontent with the current method of COS regulation for Canadian pipelines has been expressed by affected parties. Accordingly, it is an appropriate time to consider alternatives to traditional COS regulation.

The paper is organized as follows. In Section II, the Board's legal authority to adopt alternatives to COS regulation is addressed. Section III describes how COS regulation is applied and includes a discussion of some of its strengths and weaknesses as described in the literature, focusing more on the latter. Section IV provides a literature survey of some of the alternatives

to traditional COS regulation which have been proposed.

II) The Board's Legal Authority to Adopt Alternatives to Traditional COS Regulation

Part IV, Sections 59 and 62 of the National Energy Board Act (NEB Act) state:

> "59. The Board may make orders with respect to all matters relating to traffic, tolls or tariffs"
>
> and
>
> "62. All tolls shall be just and reasonable, and shall always under substantially similar circumstances and conditions with respect to all traffic of the same description carried over the same route be charged equally to all persons at the same rate."

These sections of the NEB Act provide the basis for the Board to set tolls for pipelines under its jurisdiction. The Act is very general and does not specify a particular method for setting tolls, giving the Board wide latitude in determining whether tolls are just and reasonable. The Board's use of COS regulation is founded in historical precedent. All pipelines or intervenors are free to propose an alternative at any time. Alternatives to COS regulation acceptable to the Board must result in tolls which comply with Sections 59 and 62 as does COS regulation itself.

III) Description of Traditional COS Regulation

Methodology of Traditional COS Regulation

The methodology employed by the Board is generally described as traditional cost of service regulation. For "Group 1" pipeline companies, Board approval of changes in tolls is required and a public hearing is normally held. In these toll applications for rate changes, information on the company's total cost of providing service is examined. The information provided sets out the company's projected annual costs of providing transportation services, including its cost of capital, and the tolls that should be collected. Included in the revenue requirement are operation and maintenance expenses (e.g., salaries, wages, materials, supplies, services), property and other taxes, depreciation and amortization of plant and other capitalized costs, income taxes, and a provision for return on investment to cover both interest on debt and earnings for common equity capital. In support of the return on investment component of the cost of service, information is provided respecting the company's rate base, capital structure and other investments related to the company on a deemed consolidated and unconsolidated base. This information is normally required in the analysis of the appropriate deemed pipeline utility capital structure to determine if there is any cross-subsidization of non-utility operations of the company. In addition, information is provided concerning the financing of the utility investment and costs of capital. Cost of capital information, in part, reflects historical transaction arrangements and current financial market conditions. In determining what constitutes a fair return on common equity, the Board typically relies on the following criteria:

a) return to investors should be commensurate with returns from alternative investments of corresponding or comparable risk;

b) return should be sufficient to maintain confidence in the financial integrity and long-run stability of the regulated operations of the utility; and

c) return should be sufficient for the utility to maintain its creditworthiness so as to enable it to attract the capital necessary to fulfil its service obligations to its customers.

A fair return is predicated on efficient and economical management, and varies with capital market and business conditions.

To satisfy these criteria, the Board considers the expert testimony of company and intervenor witnesses as well as evidence on both current financial conditions and forecast financial conditions for the test year. Recommendations on a fair rate of return on common equity are based on the results of estimation of one or more the following techniques:

1. Comparable Earnings[9]
2. Discounted Cash Flow[10]
3. Equity Risk Premium[11]

A review of the application via the public hearing process provides the Board with additional information for examination and interpretation of the evidence, and the basis for its decisions respecting revenue requirements and the design of tolls to recover such costs.

As for "Group 2" pipeline companies, a lesser degree of financial regulation is involved. The tolls of the Group 2 companies are normally reviewed on a complaint basis.

Under the current methodology, tolls are designed under either of the Variable Cost of Service method or the Fixed Toll method. Under the former methodology, tolls vary from month to month to reflect actual expenses and throughput. Under the later methodology, tolls are fixed for a test-year period based on approved revenue requirements and throughput volumes.

The Board attempts to ensure that, to the greatest extent possible, tolls are cost-based and are just and reasonable. In addition, tolls are designed to be fair and to ensure that pipelines have the

financial stability needed to ensure reliability and safety. Since the tolls charged by the pipeline are directly related to the costs incurred, this amounts to a "cost-plus" approach to the financial regulation of these pipelines.

The strength of traditional COS regulation is that it prevents a regulated firm from earning profits which are substantially higher than would be possible under competitive pressures, while protecting the firm's financial integrity. At the same time, traditional COS regulation provides an incentive to the utility to deliver high quality service. All new facilities must be certificated by the Board, reducing the possibility that unnecessary capital costs are incurred. Traditional COS regulation has ensured that the utility's customers are treated in a non-discriminatory fashion. Traditional COS regulation has been found to meet the "just and reasonable" requirements of Section 62 of the NEB Act.

Traditional COS regulation sometimes uses a forward test year which can give the utility an incentive to improve its cost-effectiveness. With a forward test year, the utility could retain any cost savings until the next toll review at which time the savings would be passed on to tollpayers. It has also been suggested that a utility's cost of capital is lower when the regulatory regime is stable and predictable. Since the cost of capital can represent a large portion of the cost of service, any increase in the cost of capital would be passed on to the tollpayers. Lastly, regulators frequently examine the expenditures of a utility through prudency reviews. Expenditures found to be inappropriate would be excluded from the cost of service and would be paid for by the utility's shareholders. This provides an incentive for the utility not to incur imprudent and excessive costs.

Issues in Traditional COS Regulation

Critics argue that regulated firms subject to traditional COS regulation do not have sufficient incentive to be economically efficient. In some of the literature surveyed for this paper, economic efficiency has various interpretations. For the purpose of this discussion we will use the generally accepted definition: economic efficiency embraces three concepts (i) cost-

effectiveness, minimizing the cost of service in the present; (ii) dynamic efficiency, responding over time to market pressures to develop new services and new ways of improving productivity; and (iii) allocative efficiency, pricing services appropriately in light of market conditions. It is argued that the lack of emphasis on economic efficiency associated with traditional COS regulation, results in serious economic costs which mount over time.

Other problems allegedly associated with traditional COS regulation include: the difficulty in determining the appropriate ROE, the administrative costs, and the possibility of cross-subsidization.

Based on a survey of the available literature on this subject,[12] the perceived problems with traditional COS regulation are briefly discussed below:

1) Lack of Cost-Effectiveness

Cost-effectiveness means the production (and provision) of a specific product or service at the lowest possible cost. Economists sometimes refer to this as technical efficiency.

Critics of traditional COS regulation argue that regulated utilities do not have an incentive to minimize production costs and, in fact, are actually provided with incentives to maximize expenditures. Under traditional COS regulation, the more a utility succeeds in expanding its rate base, the greater will be its total return on investment. On the other hand, if a pipeline economizes on investment capital by introducing cost-saving measures, the benefits are usually passed on to rate-payers at the next toll hearing. Therefore, it is alleged that the behaviour of utilities subject to traditional COS regulation is biased towards finding ways of maximizing investment opportunities, rather than finding ways of being cost-effective.

Firms can be technically inefficient by investing in more equipment than is required for a specific task (sometimes referred to as "gold-plating"). Critics argue that this practice is often defended under the guise of providing for public safety and operational reliability. An example of this

could be excessive caution in the number of compressors on a pipeline segment. It has been argued that regulators tend to err on the side of too much safely and reliability because, when in doubt, they would rather not be exposed to criticism for failure of the utility's service.

Finally, since the regulatory body does not have as much information as the regulated firm itself, it has been argued that it is difficult for a regulator to determine if the capital expenditures leading to an increase in the rate base were justified and appropriate.

2) Dynamic Inefficiency

Dynamic efficiency refers to the ability of a firm to respond to changing market demands over time by producing more or better products, and finding ways of producing products at lower cost. Critics argue that companies subject to COS regulation have little incentive to search for, and invest in, more cost-effective production processes because the benefits of such actions are only passed on to the consumers of the regulated firm's service, rather than realized by the regulated firm's shareholders.

Critics argue that there are at least three ways in which utilities subject to traditional COS regulation are inefficient in the long run: (i) by limiting the range of services offered; (ii) by limiting innovation; and (iii) by preventing appropriate responses to competitive pressures. It is often alleged that utilities only begin to be responsive to consumer demands or competitive pressures to reduce production costs when absolutely forced to by market developments outside their control.

One of the principal criticisms of traditional COS regulation is that it removes the incentive for pipelines to respond to the dramatic changes in the North American oil and gas markets. Critics have argued that falling prices and profit margins for producers should have spurred cost-cutting in the pipeline sector and suggest that traditional COS regulation allows pipelines to increase costs irrespective of market conditions.

3) Allocative Inefficiency

Whereas technical efficiency refers to the provision of a particular service at the lowest possible cost, allocative efficiency is achieved when products and services are provided to those users who most highly value them.

Economists have long argued that a market pricing system is the best method of ensuring that goods and services are allocated to those who place the greatest value on them. For example, if a pipeline were operating at capacity and monthly nominations by shippers exceeded the available capacity, it could be argued that the most efficient way of allocating the available capacity would be to hold an auction - this would ensure that those who were willing to pay the most for the capacity would obtain it.[13]

It has been argued that the nature of COS regulation, under which prices are set on a cost-plus basis, results in prices which do not reflect the market value of the service provided, and does not send the correct market signals to users of utility services. For example, in situations where there is increasing demand to transport gas to markets but there are pipeline capacity constraints, the market value of pipeline capacity would tend to rise. In the absence of rate regulation, the price for transportation would also arise. The increased price of transportation would act to weed out marginal shippers and only the most profitable new sales would proceed; i.e. only those which could bear the market cost of transportation. Under COS regulation it is normally not possible for a pipeline to raise its prices in such situations in order to effect an efficient allocation of the available capacity.

It is recognized, however, that to allow a monopoly transporter to set tolls according to market conditions would open the door to monopoly power. Therefore, although it may be true that traditional COS regulation interferes with the market signalling role of prices, it may also be difficult to find a solution which does not give the transporter significant power to set prices to earn excessive profits and practice price discrimination.

4) Appropriate Return on Investment (ROI)

An important aspect of traditional COS regulation is the determination of a firm's cost of capital. While it may be easier to calculate the cost of a firm's debt (usually the weighted average of the interest rate on loans and bonds), estimating an appropriate ROE (return on equity) for a regulated firm is more difficult. The return on equity must be sufficient to maintain equity capital, and provide for financial and business risk, but not so high as to give above-normal returns to the shareholders.

If the ROE is too high, the regulated firm may be encouraged to inflate its rate base beyond that required for efficient production. If the ROE is set too low, the regulated firm may not be able to attract enough capital to sustain efficient asset levels. Service quality could fall as a result.

One of the elements used by regulators in determining an appropriate ROE is the "comparable earnings" test, under which the rate of return requested by the utility is compared to the ROE earned by comparable non-regulated firms. Critics have alleged that, analogous to wage bargaining practices, when one pipeline gets a "good" settlement, there is a tendency for other decisions to follow the leader.

Another criticism of the way ROE is determined is that there is a tendency to over-reward utilities relative to the risk exposure they incur. Critics suggest that the level of risk exposure of some pipelines under the Board's jurisdiction is not as high as is claimed.

5) Risk Allocation

It has been suggested that traditional COS regulation does not allocate risk between utilities and their customers in an equitable manner. Critics argue that traditional COS regulation essentially minimizes the financial risk for utilities while ensuring that their profits are maintained. Once the regulator has allowed a utility to install facilities, some argue that the risk of these facilities being under-utilized falls not on the utility's shareholders but rather on its tollpayers. If the

facilities are under-utilized, the utility seeks to recover its total revenue requirement from the remaining customers, thereby causing tolls to increase.[14]

5) Administrative Costs

One study in the U.S. indicated that for every dollar spent by a regulatory agency, there was an additional forty dollars spent by the firms and other government agencies involved in that sector in complying with the regulation. Although there does not appear to be a similar work done for Canada, rate hearings may impose a significant burden on interested parties in Canada as well.

Procedural Shortcomings

The adversarial nature of rate hearings has been another criticism of traditional COS regulation. These hearings are often characterized by the regulated firm arguing for higher revenues and tollpayers and consumer associations arguing against them. Since these rate hearings occur frequently, the same debates are continuously replayed.[15]

7) Cross-subsidization

A regulated firm often engages in a number of related non-regulated business activities. Critics argue that there is an incentive for the corporate entity to try to shift costs from the unregulated portion of its business to the regulated side while shifting profits in the other direction. All costs associated with the regulated side will be fully compensated for through tolls while any extra divested profits would be returned to the unregulated side's shareholders.

IV) Alternatives to Traditional COS regulation

In this section, we provide a brief description of some of the alternatives to traditional COS regulation which have been proposed in the economic literature. Some of these are purely conceptual while others have been adopted by some PUBs (primarily in the U.S.) for trial

purposes. The proposals can be classified into two types: A) those that are essentially modifications of traditional COS regulation ("incentive mechanisms"); and B) those that replace traditional COS regulation.

A. Modifications to Traditional COS regulation

1) Market-Basket Determination of Return on Equity

Description

Under the "market-basket" approach described by Kruger (1988), a regulated firm's ROE is limited to the average ROE for a group of companies with similar characteristics, known as the "market-basket". First, an appropriate set of companies is chosen as the comparison group. These companies must be non-regulated, listed on a stock exchange and have similar characteristics. Business risk, capitalization and geographic location have been suggested as comparison criteria.

Once the appropriate comparison companies are chosen, their current ROEs are combined. This average becomes the highest ROE that the regulated firm is allowed to achieve in the coming period. Under this type of comparison, calculation of an appropriate ROE is based on the net earnings of the comparison group, rather than being determined in a hearing process before a regulatory board.

Under such a regulatory scheme, the regulatory board might assume a more passive role; this would depend on the regulator's involvement in setting tolls. The regulator would continue to monitor service quality and follow the regulated firm's stock price changes in the stock market.

Rate Determination

Under a market-basket approach, the non-ROE components of the tolls could be set as under traditional COS regulation or, alternatively the regulated firm could be given more flexibility in setting its tolls than it currently has under traditional COS regulation. While non-discrimination would be required within customer categories, the regulated firm could have more freedom to set different tolls for different classes of service. An example of such pricing flexibility would be to allow the auctioning of interruptible service.

Should the regulated firm exceed its allowable ROE, its tolls would be scaled back to adjust for the difference.

Potential Benefits and Drawbacks

The authors of this scheme claim that the market-basket approach directly targets the issue of determining an appropriate ROE. Letting the regulated firm's ROE be determined by the stock market addresses the criticism that a regulated firm's equity is not subject to market forces. Basing a regulated firm's ROE solely on the stock market performance of other comparable companies lets the regulated firm's ROE rise and fall in response to economic cycles.

The market-basket approach is also expected, by the authors, to reduce the administrative burden of the regulatory board. The determination of the ROE would be based on the stock market, not on a regulatory board evaluation. It would still be necessary for the regulator to monitor service quality and ensure that tolls are non-discriminatory and are just and reasonable through periodic reviews. Additions to the rate base would also need to be reviewed regularly.

Giving the regulated firm the flexibility to set its own prices, within certain guidelines, could perhaps encourage the utility to send "better" price signals to its ratepayers. If the prices set by the firm were more allocatively efficient, the market-basket approach could help ensure that the regulated firm's services would be used by those customers who most value it. However, the

designers of this approach realize that there is little incentive for a regulated firm to strive to improve its cost-effectiveness because its ROE is based on a market-basket, rather than its own efficiency and it does not deal with other alleged problems such as gold-plating.

The methodology described by Kruger would tend to result in a lag in the ROE being earned by the regulated firms. It would also be necessary to determine an appropriate comparison group for Canadian interprovincial and international pipelines. To avoid "circularity" (i.e. basing a pipeline's ROE on what other pipelines have received), the comparison group would have to exclude similar, regulated companies.

Examples of Implementation

This approach does not appear to have been implemented in the form described here. While most regulators determine ROE based at least partly on a comparison with other companies, none as yet relies solely on a comparison group made up of non-regulated companies for this determination.

If traditional COS regulation was to be modified to adopt the market-basket ROE methodology, it is not clear what changes would be necessary to accommodate variations in the volume of gas or oil shipped without adversely affecting the optimum usage of the existing facilities. It is also not clear whether the same comparison group would be used over the years or if different firms would be selected from time to time.

2) Yardstick Cost Comparison

Description

Under the "yardstick" cost comparison approach, as described by Shleifer (1985), and Joskow and Schmalensee (1986), a regulated firm's prices are not based on its own costs but rather on the costs of comparable regulated firms operating under similar conditions. Similar conditions imply

that firms face comparable technical and economic opportunities, costs and constraints.

With a yardstick approach, the traditional link between a regulated firm's costs and its own cost of service (revenue requirement) is broken. Breaking this link is intended to eliminate the cost-plus aspect of COS regulation and provide an incentive to the firm to minimize its costs. Any cost advantage that a regulated firm can gain over its comparison group will result in higher earnings. Thus, this approach introduces an element of competition between regulated firms.

Rate Determination

To initiate the implementation of the yardstick approach, a traditional COS regulation rate hearing would be held for the regulated firm in question. The cost of service would be determined and tolls would be set based on the cost of service. An appropriate comparison group of regulated firms, based on similar operating conditions, would be chosen. A review period would be established, after which the changes in the costs of the comparison group would be calculated. The average change in cost for the comparison group (the "yardstick") would then be used to set the new prices for the regulated firm in question.

The time between rate hearings would be the same as under COS regulation. If there were an increase in time between rate hearings (the regulatory "lag"), the regulated firms would have an added incentive to reduce their costs because they would keep any cost savings between hearings.

Potential Benefits and Drawbacks

By separating the regulated firm's costs from its revenue requirements, because the latter is determined by other firms' costs, the yardstick methodology is designed to encourage cost-effectiveness. The firm can only increase its earnings by cutting costs or boosting productivity. Thus, an important aspect of this approach is that the regulated firm be allowed to keep any extra earnings that result from such cost-efficiency. It is the potential for extra earnings which provides the incentive to be more efficient.

The yardstick approach does not promote allocative efficiency and the strong emphasis on restricting cost increases does not encourage dynamic efficiency. There is no incentive to provide new services or to be innovative, only to trim costs within the current operating framework.

The only change over traditional COS regulation is in the determination of the allowable escalation of costs. All other aspects of COS regulation are retained. As with the market-basket approach, the authors of this scheme recognize that an appropriate comparison group must be found. Given the relatively small number of Group 1 pipelines in Canada, it seems unlikely that they would form a comprehensive comparison group. One way of dealing with this could be to design statistical techniques to account for differences between the pipelines.

If there is to be a sort of "cost competition" between regulated firms, with firms vying to achieve the lowest operating costs, as envisioned by this approach, they would have to use identical accounting procedures and have similar timing and financing for large investments. Any deviations would result in firms, which would otherwise be identical, having different cost functions.

Since this method is only a minor modification of traditional COS regulation and it involves the additional function of monitoring a comparison group, the administrative load on the regulatory board could be higher.

Examples of Implementation

The yardstick cost comparison approach is currently used by Medicare in the U.S. to determine the compensation which will be paid to medical health care providers who work for Medicare.

If the yardstick cost comparison method is to be adopted, similar measurement issues, as for the market-basket method, would exist, i.e. how to account for deviations from the forecast data and how should the comparison group be selected over the years.

3) Levelized Tolls

Description

Under COS regulation, assuming straight line depreciation, the cost, and therefore price, for a utility's services typically declines over time as the value of the equipment depreciates over time. It has been suggested that this can lead to several problems for long-lived, capital intensive projects.[16] The first problem is that, due to the high initial prices for its services, the project may not get built at all. Second, such "front-end loaded" tolls create price discrimination between projects of different ages. The toll charged by a younger project is higher than that charged by an older project and yet they provide the same service. Finally, it has been argued that tolls which decline over time create an inter-generational inequity. The initial users of a project's service pay a higher cost than those who use the services later.

As a solution to this front loading of tolls, it has been suggested[17] that straight line depreciation be replaced with an "economic" depreciation which measures the change in the value of an asset over time. Both finance and economic theory hold that the economic value of an asset is equal to the present value of its future cash flows. Economic depreciation can therefore be defined as the rate of change in the present value of cash flows over the life of an asset. Under traditional accounting rules, the yearly depreciation is calculated by estimating the useful life of the asset and dividing this into the original cost.

In contrast to COS regulation, using economic depreciation results in lower initial tolls. Despite the differing revenue streams, both methods provide the same overall return. The scheme's authors suggest that the difference lies in the increase in allocative efficiency and inter-generational equity. In addition, using this method reduces the initial toll over that which would arise under COS regulation, thus making more projects viable.

Rate Determination

The only difference between using levelized tolls and those calculated under COS regulation is in the determination of the depreciation. COS regulation typically uses straight line depreciation instead of the economic depreciation used in this method. All of the other components which go into determining the toll remain unchanged.

Potential Benefits and Drawbacks

The primary benefit for levelized tolls is the increase in allocative efficiency over the tolls calculated under COS regulation. It is argued that the initial customers (and therefore supporters) of a project should not be penalized through high initial tolls while others wait to see if the project gets built and then join later, when the tolls are lower. In addition, using economic depreciation could lessen the toll differences between projects of different vintages. Finally, this method might lessen the inter-generational inequity created by charging the highest tolls when a project is new but reducing the charges over time.

Two drawbacks of this method, discussed by its authors, are that it would require a shift in the accounting methodology that regulated firms typically use and that it would require unique financing arrangements. This method creates an inequality between the revenue stream and the debt interest requirements of the regulated firm.

4) Price Caps

Description

Price caps, or automatic rate changes, have been proposed by Sudit (1979) and Baumol (1982). This approach provides a mechanism for a regulated firm to adjust its rates without resorting to a rate hearing. A limit, or cap, is placed on the amount by which the regulated firm can increase its tolls. This cap is determined by a formula which bases the increase on an estimate of the

expected annual increase in the firm's operating costs less an estimate of the expected increase in productivity.

Under a price cap scheme, it is unlikely that a regulated firm would be able to pass its full increase in costs to its tollpayers. As long as there is some expected increase in productivity, tollpayers would benefit from lower price increases than under COS regulation. To maintain the earnings it would have under COS regulation, the regulated firm would be encouraged to at least achieve the expected productivity increase. Should the regulated firm exceed the expected productivity increases, it would be allowed to keep the extra earnings.

The regulated firm could, of course, increase its tolls by less than the price cap imposed by the price adjustment formula. If the price cap applied to the average of all of the regulated firm's services, it would provide the regulated firm with flexibility to set tolls to meet competition from other pipelines or other fuels.

A price cap mechanism could also be altered slightly in order that the failure or success of the regulated firm in cutting costs can be shared with its tollpayers by allowing only a portion of the net cost increase to be passed on in price changes.

Rate Determination

To initiate the adoption of the price cap methodology, a comprehensive toll hearing would be held at which time the cost of service and initial rates would be determined as a base. The regulated firm would propose the appropriate cost and productivity measures and, subject to intervention, the regulatory board would choose the appropriate formula for future toll increases. Subsequent toll increases would be determined by the formula.

As noted earlier, the price cap could be applied to each service offered by the regulatory firm or, alternatively, the cap could be applied to the total cost of service. In this way, the regulatory firm would be allowed to increase the price on some services in excess of the cap while keeping

the increase for other services lower. On average, however, the price increases would have to respect the cap.

Potential Benefits and Drawbacks

Supporters of this proposal claim that price caps provide a strong incentive for the regulated firm to improve its economic efficiency. First, cost-effectiveness is enhanced because the regulated firm is not allowed to pass along the full increase in its own costs. The productivity factor would force a regulated firm to attempt to continuously improve its productivity, either through cost-cutting or by adopting innovative technology.

Second, by granting the regulated firm increased flexibility to set tolls, allocative efficiency could be improved over COS regulation.

Finally, the pressure to improve productivity could, over time, force the regulated firm to innovate. Cost-cutting for traditional operations can only be taken so far before the quality of service begins to deteriorate. Additional productivity gains must come from innovative practices or by providing new services. In this way, dynamic efficiency could be enhanced over that under traditional COS regulation.

The adoption of a price cap scheme may reduce the frequency of toll hearings. Periodic hearings would still be required to allow for new investments and to ensure that service quality has not deteriorated and that the financial integrity of the regulated firm is not jeopardized.

Price capping removes the need to calculate the ROE. The regulated firm is free to increase its earnings by aggressively adopting cost-effective measures or by being more productive. The idea is that the restriction on toll increases should keep the ROE at a reasonable level.

While this methodology is still founded on the basic principles of traditional COS regulation, in some ways it represents a significant departure. It modifies the cost-plus nature of COS

regulation and eliminates the need to determine the appropriate ROE. The simplicity of this approach is undoubtedly largely responsible for its appeal. This simplicity, however, may mask some of the difficulties involved with successfully implementing this method.

The designers of this scheme recognize the difficulty in devising the "appropriate" cost and productivity measures. One possibility, the Consumer Price Index (CPI), is a measure of changes in the average costs for consumer goods but does not necessarily represent the changes in costs for regulated firms. Other cost indexes could be designed, but a truly useful cost index would have to reflect the changes in the costs to the regulated firms, in this case pipelines.

It would also be necessary to determine a reasonable productivity index. A common suggestion is to use the regulated firm's Total Factor Productivity (TFP). TFP provides a very broad measure of the changes in a firm's productivity using factors like capital, labour and dividing them by the throughput of the pipeline. A recent analysis has, however, shown that TFP measurements are not always reliable.[18] Changes to accounting methodologies may also be required.

Examples of Implementation

British Gas & British Telecommunications[19]

British Gas, the monopoly charged with supplying, transmitting and distributing natural gas in the U.K., was privatized in 1986. As part of the privatization process, the government set up several regulatory bodies to monitor and set rates. A line was drawn between the tariff sector (residential and small business, using up to 25,000 therms per year) and the contract sector (commercial and industrial, using over 25,000 therms per year). The tariff sector had initial tolls set using traditional COS regulation methodology. Price increases after that were determined by a productivity incentive formula; i.e., a price-cap mechanism was implemented.

This formula initially set the maximum yearly increase in transportation rates at the general inflation rate in the economy less two percent. The company was expected to make up the two percent through efficiency and cost cutting initiatives. The contract sector is not subject to the price cap formula but British Gas is required to provide non-discriminatory service according to a published rate schedule. Buyers in the contract sector have the option of purchasing their gas from suppliers other than British Gas and having the gas delivered through British Gas' pipeline system at the same toll as British Gas charges for its own transportation service.

When British Telecommunications was privatized in 1984, a similar scheme was adopted but the expected productivity rate increase was set at three percent, reflecting a perception that higher productivity gains were expected in the telecommunication industry.

It is difficult to gauge the relative "success" of the British use of price caps because they were implemented at the same time as privatization. Bhattacharyya and Laughhunn (1987) suggest that while the basic concept is simple, there is not so much a difference in the total amount of regulatory oversight between the U.K. and similar regulation in the U.S. but rather a different focus. The price cap approach in the U.K. focuses on price control in the core market while traditional COS regulation focuses on profit control.

AT&T[20]

The Federal Communications Commission (FCC) in the U.S. adopted price cap regulation for AT&T in 1989. Prior to that, AT&T had received a 12 percent ROE determined using traditional COS regulation methods. Under the current method, AT&T's prices are set using a price cap formula which limits yearly price increases to the inflation rate less three percent. If the inflation rate is less than three percent, it is possible for prices to decrease in real terms. Three percent was chosen as the productivity factor because AT&T has shown historical productivity improvements of 2.5 percent/year and the FCC decided that it could squeeze out an extra half percent per year. Specific services which were not considered "basic" or essential were limited by price bands allowing limited flexibility in changing prices. AT&T's customers benefit from

reduced price increases and the company can achieve higher ROEs, but only through increases in productivity.

In describing the changes to how AT&T is regulated, the FCC commissioners emphasized that any changes would have to be of benefit to the consumer first. Great pains were taken to ensure that AT&T did not have any "loopholes" through which it could charge discriminatory prices to consumers.

Sappington and Sibley (1992) have modelled the price cap regulation of AT&T and have determined that it allows the company enough freedom in setting prices to allow subtle price discrimination. This can detract from the attractiveness of this technique. They contend, as do Joskow and Schmalensee, that some sharing of the cost risk between the company and the tollpayers can lead to more benefits for both than if the company bears all of the risk.

Other issues which would need to be addressed in the implementation of price caps would be the method of estimating changes in costs and productivity and tracking these changes through time.

5) Profit Sharing

Description

Sherman (1980, 1982) and Joskow and Schmalensee (1986) have described a "profit sharing", or sliding scale, mechanism for regulating utilities. Under this approach, a "target" ROE would be set by a regulatory board. Any deviations in the actual ROE above or below this target would trigger a change in tolls. If the actual ROE was higher than the target, the tolls would be lowered. The opposite would happen if the actual ROE failed to meet the target.

The change in tolls, however, would only partly reflect the difference between target and actual profits. A sharing fraction, determined in advance, would split the difference between the regulated firm and its tollpayers. If the fraction was set at 0.5, the regulated firm would be

allowed to keep half of the increased profits and the remaining half would be passed on to consumers through lower rates. Allowing the regulated firm to keep some of the extra profits would give it some incentive to operate more efficiently.

It would also be possible to modify the sharing fraction so that the regulated firm's share of profits would be dependent on the actual level of profits. The regulated firm could, for example, receive 25 percent of the first 100 basis points above the target ROE (and, of course, only receive a corresponding increase in prices if the actual ROE is below the target), 50 percent of the next 100 basis points, and so forth. This could provide a stronger incentive than a simple fraction approach.

Rate Determination

Under profit sharing the tolls would be set in the same manner as under traditional COS regulation. The regulatory board would set the target ROE for the next period and would determine the fraction for sharing profits and losses. At the end of the test period, the target ROE would be compared to the actual ROE that the regulated firm achieved. If the actual profit differs from the target, the tolls would be adjusted up or down accordingly.

Potential Benefits and Drawbacks

Its supporters claim that profit sharing would provide a clear and simple incentive for the regulated firm to cut costs and be more efficient. Unlike traditional COS regulation, the regulated firm retains a portion of any extra profit.

It is argued that, if the regulated firm is given some flexibility in adjusting its tolls in response to variations in expected profit, allocative efficiency and dynamic efficiency may be enhanced. Since the regulated firm keeps a portion of any extra earnings, it may choose to provide innovative services that would improve its earnings over a longer period.

The authors of profit sharing believe that it is a relatively simple concept to understand and could be implemented without major changes to COS regulation methodology.

The regulatory board would have to decide when profits resulted from initiatives undertaken by a pipeline and when these profits arose from circumstances beyond the pipeline's control. It may not be reasonable to reward the pipeline by allowing it to keep such profits.
Determining what the appropriate sharing fraction should be will be contentious. All that can be said is that it must be high enough to encourage the pipeline to increase its earnings through efficiency measures.

The authors of this scheme point out several drawbacks to this proposal. Profit sharing of the sort discussed here would provide an incentive for a pipeline to minimize its accounting costs. However, the accounting costs may not be the same as the true economic costs associated with providing pipeline service. For example, while a piece of equipment is fully depreciated in an accounting sense, it may still be fully usable and thus have an economic value. Discarding the depreciated equipment before the end of its useful life would not be economically efficient.

Another important issue in the implementation of this approach is that during periods of economic change, it may produce persistently high or low profits. During inflationary periods, the regulated company's rate of return would tend to decline over time. The firm would not be permitted to increase prices by the full amount of its increases in its costs due to the imposition of the sharing fraction and thus cannot recoup the full effect of the inflation. If the regulated company is able to introduce a new operating technique which would permanently reduce its operation costs, its rate of return would rise with time, again because of the sharing fraction.

Profit sharing mechanisms provide for changes in the price levels when the target profit is different from the actual profit earned. If a pipeline were subject to this scheme and it offered more than one class of service, the regulator would have to decide how the change in tolls would be split amongst the different service classes.

6) Performance Based Incentives

Description

Performance based incentives, described by You (1990) and Irwin (1992), are monetary incentives which are paid to the utility in direct proportion to the achievement of performance targets. These rewards can be either in the form of cash or points of return on equity. The regulator chooses the performance targets (construction costs, operating costs, throughput, "efficiency", prices, etc.) and then sets the rewards or penalties for reaching or failing to reach the goals. For example, the utility may be given a one percentage point increment in ROE for every $100 million reduction in construction capital costs from initial estimates and could also be penalized one percentage point if it went over budget by a like amount. An example of a monetary reward might be $5 million in cash for every percent increase in productivity. Conversely, the utility could be fined $5 million for every percentage point decrease in productivity.

Performance targets can be set individually (i.e., construction costs only) or a comprehensive set of performance targets could be chosen. One variation of this method might be to base the rewards/penalties on a utility's performance relative to other utilities. In such a case, a utility would be given a reward for exceeding the performance targets achieved, on average, by its comparison group. It would be fined for failing to achieve the average of its comparison group.

Rate Determination

Performance based incentives operate within the framework of traditional COS regulation. With the exception of cases in which a utility is rewarded with points of ROE, tolls would be determined just as under COS regulation. In the case where points of ROE are used as the reward\punishment, the non-ROE components of the tolls would stay unchanged from traditional COS methodology.

Potential Benefits and Drawbacks

The authors claim that performance based incentives will provide an explicit incentive for the utility to meet the performance targets. If, for example, cost performance is the chosen target for improvement, then cost-effectiveness could be enhanced. The rewards would compensate the utility for any resulting decrease in rate base.

Since this scheme does not alter the pricing of a utility's services, no improvement in allocative efficiency would occur. Also, since this method targets very specific aspects of a utility's performance, no improvement in dynamic efficiency would be expected. Lastly, the regulator would have to determine the performance targets and reward mechanism. This would likely add to the administrative burden.

Examples of Implementation

Several state Public Utility Commissions in the U.S. have experimented with performance based incentives of the type described here. In the 1980s, New Jersey and New York introduced programs which targeted the completion costs of several unfinished nuclear power plants. If the utilities went over budget, they could not recover the full amount of the construction costs. Conversly, the utilities were allowed to keep a portion of any savings resulting from construction costs being below budget.

During the construction of the Alaska Natural Gas Transportation System (ANGTS) prebuild, also known as Foothills Pipe Lines (Yukon), the National Energy Board approved an "incentive rate of return" (IROR) scheme to provide Foothills with a financial incentive to control costs during construction of the pipeline.

The scheme provided for a one-time adjustment to be made to the Company's rate base, the size of which was determined by the degree of cost effectiveness achieved by Foothills in constructing the pipeline. Generally speaking, the degree of cost effectiveness was determined by comparing

the actual cost of construction with a previously approved Final Design Cost Estimate (FDCE) and, if costs were within a specified range, converting the amount by which costs were lower than the FDCE into a one-time adjustment to rate base. The amortization of the one-time adjustment and the return earned on the unamortized balance was the financial reward earned by the Company.[21]

In the case of Foothills, the actual cost of construction of the pipeline was approximately 96.6 percent of FDCE and pursuant to the incentive scheme a one-time adjustment of $25.85 million was made to the Company's rate base. The company was allowed to amortize and earn a return on equity on this additional amount.

Several issues would need to be resolved before performance based incentives could be implemented for pipelines in Canada. What would be the appropriate performance targets, how should the rewards and penalties be selected, and how would the regulator pay the rewards if they were given in cash?

B. Replacements for Traditional COS regulation

The following two alternatives, efficient pricing mechanisms and franchise bidding, involve the replacement of COS regulation with completely different regulatory approaches.

1) Efficient Pricing Mechanisms

Description

Under competitive markets, the price of a commodity would tend to equal the cost of producing the incremental unit of that commodity whereas regulated utilities have their prices set to equal the average cost of production for their total expected output. However, using average cost to set prices introduces distortions in buying decisions; it does not result in allocative efficiency.

In the short run, utilities with fixed facilities have incremental costs which decrease as their output increases. This means that the incremental cost is less than the average cost so if price is set at the incremental cost, the utility would not be able to recover all of its production costs. This could bring financial ruin upon the company.

Several writers have proposed so-called efficient pricing mechanisms to deal with this issue.[22] The basic scheme is to encourage a utility to set its prices equal to marginal (incremental) cost and provide a cash subsidy to the firm equal to the deficiency between its incremental and average costs.

Rate Determination

The regulated firm would be encouraged to set its tolls based on marginal costs and would be paid a subsidy to offset any financial deficiency.

Potential Benefits and Drawbacks

The primary benefit of implementing a marginal cost pricing scheme, according to its advocates, is that, properly implemented, it is more allocatively efficient than COS regulation. Pricing at marginal cost is the most economically efficient possible choice.

It is argued that these mechanisms could also promote cost effectiveness because the regulated firm can increase its earnings by lowering its costs. Lower costs could lead to lower prices for the tollpayers but a larger subsidy for the regulated firm.

Efficient price mechanisms, once in place, could require less involvement on the part of the regulator. Regular hearings may no longer be required.

Authors on the subject of these pricing mechanisms recognize that the need to provide subsidies to utilities under these schemes would not be politically popular. None of the authors provide

guidance on where the regulator will get the funds to pay the subsidy.

Examples of Implementation

There is no indication that this type of a scheme has been applied to a regulated utility. The California Public Utilities Commission (CPUC) is considering using a long run marginal cost approach to pricing the services of gas distribution utilities.

If an efficient pricing scheme is to be adopted, a number of issues would need to be addressed, i.e. where would the money to pay the subsidy come from, how would the accounting methodology need to modified, how would the incremental cost and demand curves be derived, and how could these schemes be applied while ensuring that tolls remain just and reasonable.

2) Franchise Bidding

Description

Demsetz (1968) has proposed replacing traditional COS regulation with franchise bidding. Firms would bid on the right to provide exclusive service for a particular area. The winning bid would be the one which provided for the lowest cost of service. This could be applied to new services as well as existing firms.

In order to ensure that the incumbent provides the service which was promised, the franchise would be awarded for a fixed term. After the term of the franchise is over, the incumbent firm would have to bid for the franchise again. If the previous franchise operator was not the winning bidder, the entire assets of the regulated firm would have to be transferred to the new operator. During the term of the franchise, the operating firm would face no competitive pressures. It would, however, have committed to provide service at a fixed price and any earnings or losses would depend on the firm's management. Assuming the franchise operator is inclined to maximize profits, the regulated firm would have an incentive to operate in a cost-effective

manner.

Rate Determination

Rates would no longer be determined through COS regulation. The regulator could set guidelines for pricing which the franchise winner would have to follow but, ultimately, the prices would be determined by the winning bid. The actual rate structure would have to be negotiated between the regulator and the competing bidders. The regulator could determine a formula to provide some flexibility in setting at least some of the tolls.

Potential Benefits and Drawbacks

Its supporters claim that franchise bidding could provide a more cost-effective method of providing regulated service. If the bidding process for the franchise were truly competitive, the outcome would be that the winner would provide the service at the lowest possible cost while remaining financially viable.

If the franchise operator were given some discretion in setting prices, the outcome could result in greater allocative efficiency than under traditional COS regulation. The winning bid (i.e. price) would still be based on average costs, however, and thus it would not be ideal from an efficient pricing perspective. If the operator had to maintain a core service at fixed prices but was given the freedom to offer other services, there would be a strong incentive to offer innovative services which would not require fixed prices. An operator might even be willing to suffer losses on the core service in order to obtain access to the unregulated markets.

The role of the regulator would be to choose the bidding parameters, pick the winning bid and monitor quality. It would not require auditing or any hearings beyond that of choosing the winning bid.

Williamson (1976) provided some analysis of the operational problems associated with the use of franchise bidding. The cost of transferring assets during an exchange of franchise operators could be quite high. Simply preparing the bids would require a great deal of effort on the part of the bidders. It would be difficult to place a value on much of the physical equipment once it had been in use for a period of time. Some of the personnel might leave with the previous operator leaving a gap in operational knowledge.

The incumbent would also have an advantage over other bidders at the end of the franchise term because it would have more complete knowledge of the costs and value of the assets.

Examples of Implementation

Franchise bidding had been used in the cable T.V. industry in the U.S. during the 1970s. Williamson evaluated the initial experience with cable franchising and found that it was not clear that it provided any significant benefit over COS regulation.

It is not clear that the resulting tolls would be non-discriminatory as well as just and reasonable. Other important questions include the appropriate length of the franchise term, how to mitigate any costs and nuisance for tollpayers which might accompany a change of management, and how to account for the risk that a new operator might fail financially.

V) Conclusion

In closing, it is emphasized that the purpose of this paper is to stimulate discussion on alternatives to traditional cost of service regulation. The alternatives discussed here are intended to be of an illustrative nature and should in no way be construed as limiting or indicative of the Board's position on this issue. There may be other options that this paper has not considered; the Board is interested in any option which sheds light on the issue of alternative ratemaking regulation.

NOTES

1 - See Kahn (1971) pp. 123 - 124.

2 - "Prophets of Regulation" by T.K. McCraw, p. 12, Belknap Press of Harvard University Press, Cambridge Mass., 1984

3 - FERC, Notice of Proposed Policy Statement on Incentive Regulation, dated March 13, 1992, Docket PL 92-1-000

4 - Canadian Upstream Oil and Gas Industry Profitability - Historical Review and Future Perspectives. PowerWest Financial Ltd. Sept. 1991.

5 - Canadian Petroleum Association, Written Evidence submitted in Hearing RH-2-92, re. Interprovincial Pipelines Ltd. Class 3 Toll Application and in Hearing RH-1-92, re. Westcoast Energy Application for Interim and Final 1992 Tolls.

6 - Independent Petroleum Association of Canada Written Submission for Trans Mountain Pipeline Company Ltd. Class 3 Toll Application, Hearing Order RH-3-91.

7 - Independent Petroleum Association of Canada Direct Evidence for Westcoast Energy Inc. Application for Interim and Final 1992 Tolls Hearing, Order RH-1-92

8 - Op. Cit.

9 - The comparable earnings test attempts to satisfy the requirement that the regulated utility be permitted to earn a return on equity commensurate with that of non-regulated firms with similar risk. The test consists of finding non-regulated firms with similar risk characteristics, selecting an appropriate time frame over which to study these firm's financial performance and examining their historical rates of

return over the selected time frame. The aggregate of this information forms the basis for the "comparable earnings" by the regulated utility.

10 - The discounted cash flow (DCF) test uses, as a basis for estimating the appropriate return on equity for a regulated utility, the discounted revenue stream which an investor would expect from an investment (stock) with similar risk characteristics. This test consists of selecting non-regulated firms with similar risk characteristics, estimating the revenue stream (dividends and growth in the stock's price) and finding the discount factor which equates the expected revenue stream to the stock's current price. It is this discount factor which would then be used as a basis for estimating the appropriate return on equity for the regulated utility.

11 - The equity risk premium test compares the risk premium (difference in rate of return) an investor places on common equity versus debt (bonds or preferred shares). This test consists of selecting non-regulated firms with similar risk characteristics, calculating the historical risk premiums that investors have assigned the common equity of these firms, determining if the historical rates are an appropriate basis for forecasting into the future and adding the risk premium to the long-term bond rate to estimate the basic cost of common equity for the regulated utility.

12 - This discussion is a summary of the discussion on traditional COS regulation from Kahn (1971), Bonbright, et al (1988), Berg and Tschirhart (1988), You (1990), Kruger (1988), CAMPUT (1991), FERC (1989a), Littlechild (1983), as well as the other papers referred to in the text.

13 - TransCanada has recently been given permission (see Reasons for Decision RH-4-91) to hold weekly and monthly auctions for available interruptible capacity on its system. In making its proposal, TransCanada argued that it was the best way of ensuring that the available capacity would be used by the shippers who placed the highest value on it.

14 - See Union Gas (1989)

15 - The Board has indicated that it is receptive to a settlement process under which interested parties negotiate many of the details prior to the beginning of a hearing. See National Energy Board "Improving the Regulatory Process - Current Position on Submitters' Suggestions", September 1988.

16 - See Della Valle and Watkins (1992)

17 - Op. Cit.

18 - See Joskow and Schmalensee (1986)

19 - See Terzic and McKinnon (1988)

20 - See Kruger (1988) and FCC News Release (1989)

21 - See National Energy Board Reasons for Decision RH-3-84

22 - Kruger (1988) uses the term "efficient pricing mechanisms" in reference to several alternatives to traditional COS regulation which are designed to promote allocative efficiency. Loeb and Magat (1979), Vogelsang and Finsinger (1979), and Cox and Isaac (1987) have all proposed regulatory methods which use incentives to encourage utilities to set prices equal to the marginal cost of providing services.

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National Energy Board

**Public Consultation on
Incentive Regulation**

Preliminary List of Questions to be Addressed by Parties Filing Written Submissions

This preliminary list of questions is intended to assist interested parties in the preparation of their written submissions, which are due on 30 September 1992. The questions should be interpreted broadly. The list is not necessarily exhaustive, nor is it intended to limit the scope of submissions.

1. Is the current regulatory regime still adequate for the purpose of establishing tolls which reflect cost-effective transportation services?

2. If not, could the current regime be adapted or modified to more adequately take into account economic efficiency aspects of toll regulation?

3. If the current regime were to be retained, adapted or modified, what changes could be introduced to the structure of tolls and tariffs to encourage the pipeline companies and its customers to operate in the most economically efficient way?

4. What should be the characteristics of a viable incentive regulation scheme?

5. In the light of the characteristics outlined in response to Question 4., what specific incentive regulation schemes have the potential to be viable in the Canadian regulatory and business environments? What are the strengths and weaknesses of each of these schemes?

6. Could different incentive schemes be implemented on different pipeline systems? Or, should only one general regulatory regime be implemented?

7. To the extent that incentive regulation may be appropriate in the case of certain pipelines only, what attributes should a pipeline possess to be considered for incentive regulation? Could different attributes justify different incentive regulation schemes?

8. What impact, positive or negative, could incentive regulation schemes have on the financial integrity of the affected pipeline companies, on their capital structure, or on their overall cost of capital (equity and debt)? How should any such impact be taken into account in deciding whether and how to implement an incentive regulation scheme?

9. How should the actual performance of an incentive regulation scheme be empirically measured and evaluated? How should the several aspects of economic efficiency (i.e., allocative, technical and dynamic) be measured and weighted relative to one another?

TECHNICAL WORKSHOP ON INCENTIVE REGULATION
TIMETABLE

30 September 1992	Interested parties file written submissions to the Board and serve copies on other interested parties.
23 October 1992	Interested parties submit comments on written submissions to the Board and serve copies on other parties.
November 1992	The Board releases a list of Issues for discussion at the technical workshop.
8-10 December 1992	Technical Workshop on incentive regulation held in Calgary.
1993	The Board issues workshop proceedings.

National Energy Board

CANADA

Office national de l'énergie

23 March 1992

TO: Parties Named in the Attached Distribution List

Re: **Incentive Rate Regulation**

The Board has been considering how best to examine the potential for incentive rate regulation of federal jurisdiction pipelines in Canada. The Board believes that a public consultation to review the subject would be a useful first step. Such a consultation would include an examination of:

(i) existing methodologies; and
(ii) alternatives to traditional cost of service regulation, for instance new methodologies for promoting and rewarding efficiency in pipeline companies' operations.

The Board would invite interested parties to present papers and would sponsor a workshop with opportunity for questions and discussion in a non-legal setting. The papers and the workshop proceedings would be published. The concepts developed could then be used in subsequent toll hearings, where they could be combined and tailored to the circumstances of the applicant's pipeline.

Before initiating such a consultation, the Board would appreciate receiving your views on the likely extent and nature of your participation, and any specific suggestions on format and timing of the process. A tentative timetable is attached. Comments should be filed by 24 April 1992.

Questions on this matter should be directed to Gaétan Caron, Director, Financial Regulation Branch, (403) 299-3646.

Yours truly,

G.A. Laing
Secretary

Attach.

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